SUMATRAN WERETIGER, CINDAKU: DESIGNING A 3D GAME CHARACTER ANIMATION FOR BANDUNG YOUTH BASED ON MYTHOLOGY FROM KERINCI, JAMBI

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Abstrak: Cindaku adalah mitologi tentang harimau dari Sumatera, Jambi, Kerinci. Cindaku dipandang sebagai pelindung hutan Kerinci. Sangatlah penting untuk melestarikan nilai-nilai budaya dari mitologi seperti Cindaku, terutama ketika berbicara tentang menjaga lingkungan dan keseimbangan alam. Penelitian ini bertujuan untuk menemukan nilai-nilai budaya yang terdapat dalam mitologi Cindaku dan membuat animasi game 3D berdasarkan nilai-nilai tersebut. Animasi ini kemudian diimplementasikan menjadi sebuah prototipe game. Media video game dipilih karena telah terbukti terbukti efektif dalam dunia pendidikan. Metode penelitian ini menggunakan studi literatur, wawancara, dan kuesioner untuk pengumpulan data. Penelitian ini menghasilkan animasi game 3D berdasarkan Cindaku dan nilai-nilainya, animasi tersebut dimasukkan ke dalam prototipe game yang dapat dimainkan di perangkat Android, terutama untuk telepon genggam.
***Kata Kunci**: Cindaku, manusia harimau, animasi game, Sumatera*

Abstract: *Cindaku is a mythological weretiger from Sumatra, Jambi, Kerinci and is seen as the protector of Kerinci's forest. It is important to preserve the cultural values of mythology such as Cindaku, especially when it talks about protecting the environment and the balance of nature. This study aims to find the cultural values found in the mythology of Cindaku and to create 3D game animations based on the values. These animations are then implemented into a game prototype. The medium of video games was chosen since it had been proven to be effective in education. The method for this study used literature study, interviews, and questionnaires for data collection. This study resulted in 3D game animations of a character based on Cindaku and its values, the animations were put in a game prototype that was playable on Android devices, mainly for mobile phones.*
***Keywords**: Cindaku, weretiger, game animation, Sumatra*

BACKGROUND

Cindaku is a myth in Sumatra, specifically in Kerinci, Jambi. Cindaku is known to be a weretiger who protects the balance of nature from external and internal threats (Fathonah, 2020). Cindaku serves to teach people the importance of preserving the environment and passing down traditional values to future generations. The connection between humans and nature is highlighted in the myth of Cindaku to emphasize the need to respect the balance of nature (Saketi, 2009). Myths can be told through various media and forms, including games. Games as a digital media can effectively reach people from all walks of life. Moreso, according to Dankov and Dankova (2023), video games are effective and contemporary tools for influencing and educating users. This makes video games an effective medium to spread the mythology of Cindaku.

Games based on mythology have been popular. Many people have taken an interest in these games. One example of these games would be DreadOut, a game where it brings up the topic of Indonesian horror myths. This game has become one of the most notable examples of spreading horror myths that are indigenous to Indonesia and today's society. DreadOut has an estimated revenue of $1,200,000 (GAMES-STATS.COM, 2023) which indicates that it has gained a huge player base. One beneficial outcome of this is that the Indonesian myths shown in DreadOut are now more popular.

This research includes a questionnaire filled by the target audience. The target audience of this research is gamers aged 17-22 who reside in Bandung. This specific demographic was chosen because Bandung is the researcher's place of residence which made it easier to conduct surveys and collect data. The age range of 17-22 was chosen to focus on young adults who are generally active gamers. The questionnaire done for this research revealed that the target audience do not know what Cindaku is, and for those who do know what Cindaku is, they know very little about it and its values.

RESEARCH METHOD

The research method for this paper uses a qualitative method through a process of literature study, questionnaires, and interviews. Literature studies were done through several sources such as books, articles, and journals relating to Cindaku and animation techniques. Questionnaires were taken with the target audience of Bandung gamers aged 17 – 22. Interviews were also conducted with locals from Kerinci.

THEORIES

Animation

Animation involves drawing and photographing a character, whether it is a person, animal, or inanimate object, in a series of positions to create the illusion of realistic movement. Animators exaggerate gestures and expressions, infusing their drawings with a diverse range of characters and personalities (Blair, 2020).

The evolution of animation from traditional 2D to modern 3D techniques has offered new creative possibilities and challenges. While both forms of animation aim to create engaging and lifelike movement, the methods and tools used in 3D animation differ, requiring animators to adapt to new technologies and workflows.

3D animation utilizes three dimensions, creating a sense of depth and realism. Unlike 2D animation, which is essentially flat, 3D animation operates in a three-dimensional environment using computer-generated imagery (CGI) (Katatikarn, 2024).

Video Games

Video games, commonly referred to as games, is an interactive digital media that allows players to embody characters within fictional worlds, engage in conflicts, and make choices that influence the outcome of the game. Many game studies researchers classify games not as objects to be studied, but as experiences (Kuhn & Bhéreur-Lagounaris, 2016).

Common game genres include action, role-playing, and sports. Each genre appeals to different types of players and offers unique experiences. The diversity of game genres allows players to experience various cultural narratives, including myths and folklore. Games such as DreadOut can be an effective medium for promoting traditional myths. The interactive nature of video games allows players to immerse themselves in these myths.

Game Animation

The portrayal of cultural narratives in video games often involves animations. These animations can be technically and visually complex, requiring careful consideration to execute properly. Every element in games requires technical effort to function, and game development is full of unexpected challenges that can cause the game to malfunction. A game animator should possess fundamental knowledge of character design, rigging, skinning, and integration into the game (Cooper, 2021).

Animation can be a good medium for education because animation can reach a wide audience, from children to adults. Animation is a good medium for promotion, is informative, easy to understand, and it adapts to the advancement of technology (Baharsyah, Ramdhan, & Sudaryat, 2023). The right educational medium can direct the youth's attention so that they become motivated to learn, and it helps them learn things by themself depending on how interested they are (Azwandi, 2007 as cited in Afif, 2021).

12 Principles of Animation

Animation is guided by a set of principles known as the 12 principles of animation, which were created during the early days of Disney Animation by a group of core animators referred to as 'Disney's Nine Old Men.' These principles were established to distinguish the charming aspects of animation from those that were unappealing to audiences. The principles have been documented by two of the original nine animators, Thomas and Johnston, in the book 'The Illusion of Life' (1981), which was then researched by Sárosi (2017) regarding animation in video games.

In Sárosi's 2017 research titled "Applying traditional animation principles to 3D games: animation in the Stardust Galaxy Warriors action game", the findings discover that the principles of animation in games serve not only to guarantee a specific quality of movement or character actions but also to convey and enhance the game's design.

Blender

Blender is a software that supports the entirety of the 3D pipeline—modeling, rigging, animation, simulation, rendering, compositing, and motion tracking (Blender Foundation, 2024). For this project, it will only be used for modeling, rigging, and animation to create the character of Cindaku.

Blender's animation capabilities are essential for bringing Cindaku to life. Its open-source nature aligns perfectly with the project's budgetary constraints, as it provides a powerful and professional-grade toolset without expensive licenses or subscriptions.

3D Modeling

3D modeling is a technique within computer graphics that involves creating a digital representation of an object or surface in three dimensions. This process is typically done using specialized software where artists manipulate points in virtual space, known as vertices, to form polygons that make a mesh structure which defines the object's shape. A polygon (poly) can be formed by at least three vertices. Three vertices create a triangle or a tri and four vertices create a quad. Using only tris and quads is the industry standard (Adobe, 2024).

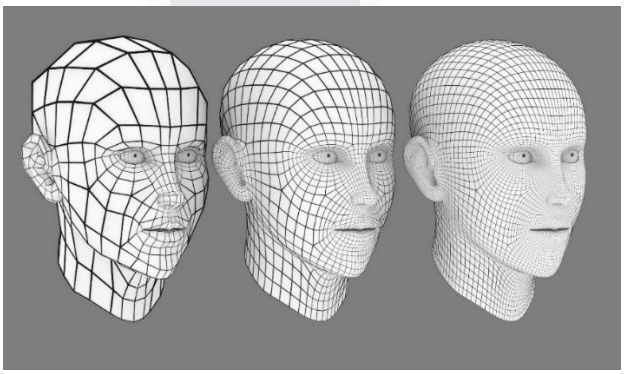

Figure 1: A 3D model of a human head.

Source: https://free3d.com/3d-model/stylized-head-base-mesh-2180.html

Texturing

Texturing is essential for enhancing the appearance of 3D objects, ranging from simple patterns to complex images tailored for specific models. These textures can transform basic shapes into realistic characters and environments. They can simulate various materials like grass, gravel, or stone and contain information about color, reflectivity, and translucency.

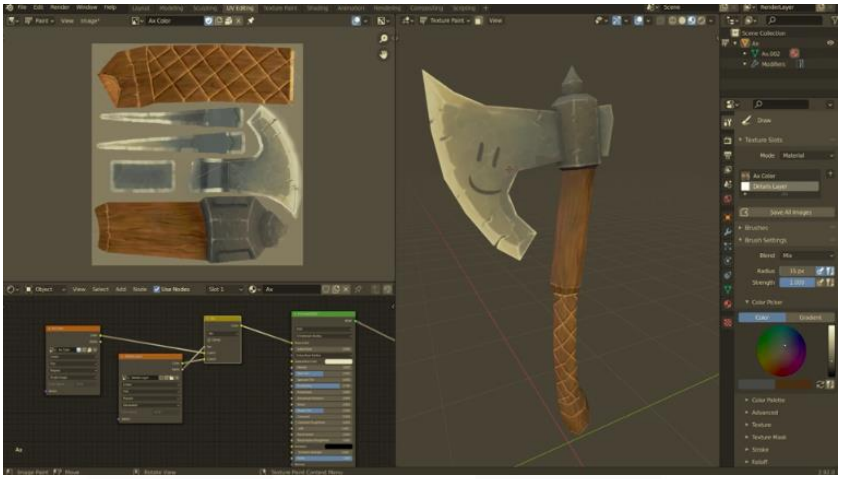

Figure 2 An example of a texture along with the 3D model it is attached to.

Source: Fundamentals of Texturing in Blender (Lampel, 2021).

Rigging

Jerjomina (2022) describes rigging as preparing a character for animation by creating a system of controls, known as a rig, that allows animators to manipulate its movement. Rigs can vary greatly depending on the medium, such as feature animations, visual effects, games, and others. In games, performance is a top priority, so riggers must create rigs that are efficient.

Game Development

Game development is the creative process of designing, building, testing, and releasing games. It encompasses concept generation, design, implementation, testing, and launch. During game development, it is crucial to consider elements like game mechanics, rewards, player engagement, and level design (freeCodeCamp, 2019).

Technology within a game can either be crafted from the ground up or utilize proprietary software unique to a particular company. With the increasing complexity of development, both companies and independent developers often resort to utilizing pre-existing "game engines" such as Unity or Unreal Engine (CB Insights Research, 2018).

Unity

Unity is widely regarded as the go-to game engine for indie and mobile game developers, with a strong presence in the industry. Its popularity is supported by statistics showing that 70% of the top 1,000 mobile games were made with Unity (Unity Technologies, 2022). The engine is known for its ease of use, making it accessible for beginners and students. Unity remains a popular choice for game development due to its community support, extensive documentation, and the ability to rapidly prototype and iterate game concepts (Dealessandri, 2020).

Character Design

Across all mediums, character design is a vital aspect of storytelling. “A good character design is a character that is memorable, believable, and right for the story” (Sullivan, Schumer, & Alexander, 2008 as cited in Yuen, Azam, & Ang, 2015) Characters are how the audience experiences the narratives, making them essential components of any compelling story.

Shapes play a crucial role in character design, with different shapes and recognizable silhouettes helping to differentiate characters and make them visually engaging. Basic character shapes often consist of closed forms like circles, squares, and triangles, which can indicate dominant masses and whether the character has straight or curved features. For instance, cute characters tend to have rounded and stunted shapes, while goofy characters are curvier with stretchy body parts (Yuen, Azam, & Ang, 2015).

DATA AND ANALYSIS

Object Data

People in Sumatra identified three main types of tigers: zoological, spirit, and weretiger. Most believed in the existence of zoological tigers (tigers commonly found in nature), followed by spirit tigers and weretigers. The description of weretigers varied, some described them as reincarnations of individuals who had committed misdeeds in their past lives, and came back to Earth to scare villagers and eat their poultry, while others described weretigers as ancestors who protect their descendants and their villages from threats, taking care of farms from wild boars, and showing villagers the way home if they get lost in the forest. (McKay, et al., 2018).

One of the weretiger stories is Cindaku, a myth from Sumatra's Kerinci, Jambi region. Cindaku is a weretiger who maintains nature's balance (Fathonah, 2020). This myth highlights the importance of environmental preservation and passing on traditional values. It highlights the close relationship between humans and nature, stressing the need to respect and preserve this harmony.

In Kerinci, the forest is seen as the tiger’s domain, and they do not prey on humans. They coexist together, which is a tradition that is centuries old (Bakels, 2004 as cited in McKay, et al., 2018). Locals said that the tigers try to stay hidden from humans and sometimes they may even help humans if they do come across each other. There have been multiple stories of tigers helping humans lost in the forest find their way out (McKay, et al., 2018).

Product Data

The final product of this research consists of the character rig, animations, and a game demo in Unity to show how the animations of Cindaku would look in-game. The character design, 3D character model, and textures are created by a third party as this research only focuses on the character animations.

In games, some staple animations include an idle, run, walk, death, and attack. These animations will be played in-game according to what buttons the player presses, giving the illusion of continuous motion (Maestri, 2001).

Data from observations, interviews, questionnaires, etc.

According to an interview with a Kerinci local, Cindaku is a folklore from the Kerinci region that states about Cindaku being their ancestor which originates from tigers (Prasandra, 2023). Christoper (2023), a tour guide of Mount Kerinci, when asked about Cindaku's appearance, claims that since Cindaku is a tale of ancient times it would wear non-modern clothing. Another interviewee said that they know the myth of Cindaku from the region of Malalak, a different region in Sumatra, but not in Kerinci (Hendra, 2023).

Analysis

The data gathered shows that Cindaku is a mythological weretiger from Kerinci. It is unclear what the true appearance of a Cindaku is like, but it can be assumed that it is a Sumatran tiger, it also would not wear modern clothing as Cindaku is an ancient tale. Cindaku is said to maintain the balance of nature (Fathonah, 2020) and it also acts as a protector of the people in Kerinci, who are believed to be the descendants of Cindaku (Prasandra, 2023). While the Cindaku generally does not like being seen, there have been stories told of people being lost in the forest until Cindaku came to guide them out safely (McKay, et al., 2018).

CONCEPTS AND DESIGN RESULTS

Character Design

The Cindaku's character design consists of a humanoid weretiger. When designing the weretiger, it is important to consider what a Sumatran tiger looks like compared to other tigers in other parts of the world. The stripes of the Sumatran tiger are close together and its fur is a darker orange than other tigers, these help the Sumatran tiger blend in seamlessly with the tropical rainforest (Castagnino, 2020).

An initial design was first created, as seen below in Figure 3:

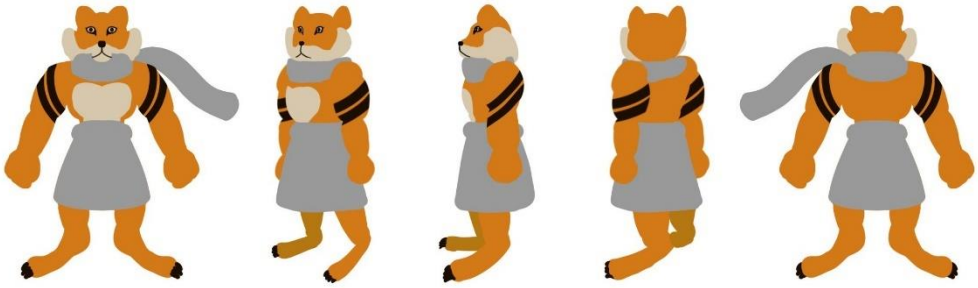

Figure 3 Initial character design for the Cindaku.
Source: Personal Documentation (2024).

The clothing that Cindaku wears is based on the information from Christoper (2023) that Cindaku is a myth from ancient times. Because of this, the decision was made to have the Cindaku wear clothing like merchants of Kerinci in the 20th century as seen below in Figure 4:

Figure 4 Kerinci merchants with a buffalo.

Source: Inwoners van de landstreek Kerintji met een karbouw (Leiden University Libraries, 1920).

Inspiration was also taken from the forest people in Jambi (*orang rimba*). They are nomadic people and they limit the interactions they have with the outside world (Persoon & Wardani, 2023), which is much like a tiger.

Figure 5 A group of forest people (*orang rimba*) in Jambi before the year 1939.
Source: en groep Koeboes mannen vrouwen en kinderen uit Djambi (Wereldmuseum Amsterdam, n.d.).

The initial design was then passed on to a hired character designer, who refined the design and made it more life-like as seen below in Figure 6:

Figure 6 Cindaku character design with and without clothes.
Source: Personal Documentation (2024).

During the process of refining the character design, some creative liberties were taken. The initial design had the scarf its wearing be long and flowy, but as this will be animated, the long scarf could often overlap with other parts of the body like the shoulders and the back. Therefore, the scarf was shortened down to only stay at the base of the neck. The proportion of the hands were also exaggerated, this is so that the claws stand out more when the player attacks.

3D Model & Texture

To ensure that players can run the game prototype smoothly, a polygon count of around 5,000 is set as the limit for the 3D model as it is the recommended amount for mobile games (3D Ace, 2024). For textures, they can either be 1024x1024 or 2048x2048 pixels depending on how detailed it needs to be.

The 3D model for Cindaku was created by a hired professional 3D artist under the supervision of the author. This approach ensured high-quality modeling that met the project's specifications and artistic vision. A high-poly model was first sculpted by the artist as seen below in Figure 7:

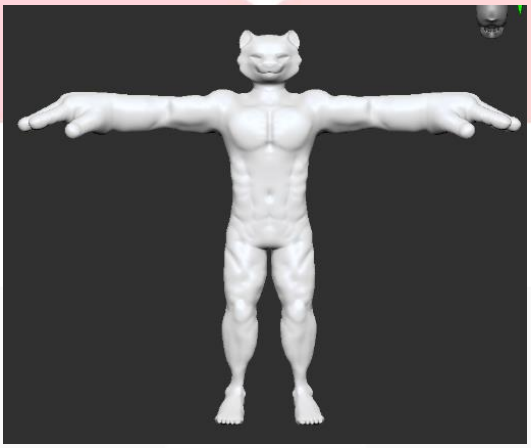

Figure 7 The high-poly model of Cindaku before it is turned into low-poly.
Source: Personal Documentation (2024).

The high-poly model used hundreds of thousands of polys which would have been detrimental to the performance of a mobile game (3D Ace, 2024). Through a process called retopology, the artist created a low-poly model based on the high-poly model as seen below in Figure 8:

Figure 8 The low-poly model of the Cindaku.
Source: Personal Documentation (2024).

The artist then proceeds to paint in the base colors to the model as seen below in Figure 9:

Figure 9 Perspective view of the game-ready Cindaku 3D model.
Source: Personal Documentation (2024).

Rig

The rigging is done in Blender using the Rigify. Rigify is an add-on that helps create character rigs automatically (Blender Documentation Team, 2024). With Rigify, the user can create a meta-rig which acts as a template for an armature as seen below in Figure 10:

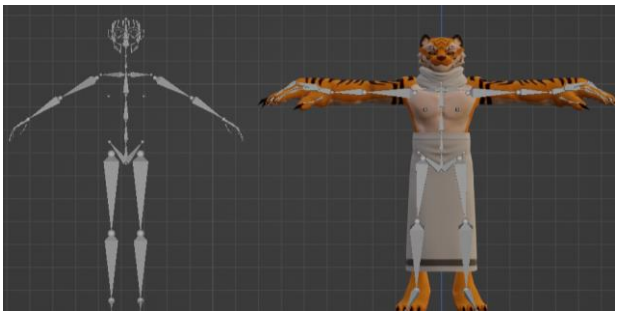

Figure 10 A default meta-rig next to the adjusted meta-rig fitted to the Cindaku 3D model.
Source: Personal Documentation (2024).

This meta-rig template would need to be adjusted based on the model it would be used for. Each bone needs to be moved into its proper place inside the 3D model. Once the meta-rig bones are adjusted into the correct parts, the rig itself can be generated complete with controllers for hips, chest, fingers, etc. as seen below in Figure 11:

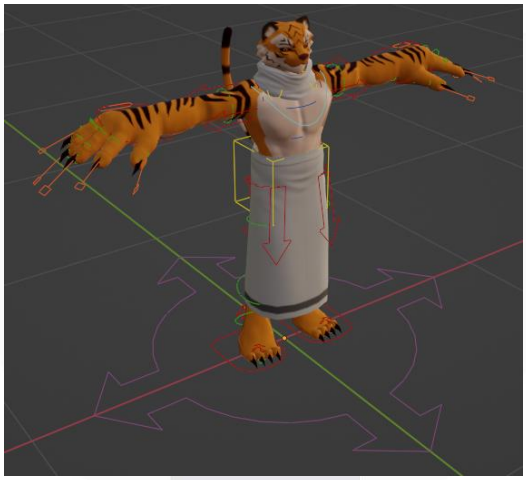

Figure 11 The completed rig for the Cindaku 3D model.
Source: Personal Documentation (2024).

Weight Painting/Skinning

Rigify only automates the creation of the rig controls and bones, so the user must attach the rig to the model (weight painting/skinning) by themselves (Blender Documentation Team, 2024). The user can do the skinning manually or they can let Blender do it automatically. The skinning for this project was done automatically and then adjusted manually, making sure there were no visual errors.

As seen below in Figure 12, when the Weight Paint mode is selected, the color of the model turns blue and red.

Figure 12 An example of bad skinning (left) and good skinning (right).
Source: Personal Documentation (2024).

Blue indicates that a part of a model is unweighted, while red indicates that a part of a model is weighted (Blender Documentation Team, 2024). Green and yellow are also used in between blue and red. It is important to paint the weights carefully for the body parts to move properly.

It is also important to adjust and smooth out the weights of body parts to avoid visual errors as seen on the left side of Figure 12.

Character Animation

The following section explains the various animations including what steps and considerations were made for each animation:

Idle

An idle animation is an animation where the character rests idly, the character breathes and the wind may affect how their clothes or hair moves (Richey, 2024). For the Cindaku's animation, it stands while breathing with its arms to its side and its claws extended, ready to defend itself against any enemies.

Figure 13 The Cindaku looking around in its Idle animation.
Source: Personal Documentation (2024).

This gesture shows how the character of Cindaku generally does not like being seen (McKay, et al., 2018).

Walk

In video games that use stealth as a mechanic, the player is required to crouch to have a more silent footstep (Clark, 2021). This principle is also used to ideate the walk animation for Cindaku. It walks in a stealthy way as if intending to hide itself better.

Attack

For the attack animation, the Cindaku scratches forward with its claws. The Anticipation before the attack is what makes the attack seem strong. To make the attack seem fast and snappy, a smear is used to show the exaggeration as shown below in Figure 14:

Figure 14 The Cindaku's attack animation with a smear.
Source: Personal Documentation (2024).

Roar

The Cindaku can roar to scare off enemies. As seen below in Figure 15, the Cindaku builds up anticipation by throwing its body backwards before letting out a roar. During the roar, its arms are wide open as to make its own silhouette seem bigger and intimidating.

Figure 15 The Cindaku "charging up" its roar.
Source: Personal Documentation (2024).

Exporting from Blender to Unity

It is required to export the animations into an .fbx file. An .fbx file is a commonly used file format to store 3D models and its animations. It is recommended to use the .fbx file format whenever possible, as it is the file format that Unity uses as its importing chain (Unity Technologies, 2024).

Once the .fbx is created, it can be imported into an empty Unity project as an object, as seen below in Figure 16:

Figure 16 The Cindaku 3D model in Unity.
Source: Personal Documentation (2024).

Camera

In 3D games, a single camera view may not be enough due to how complex the gameplay can be. Sometimes it is better for the camera to shift so it can fit the needs of the current gameplay (Brown, 2019). Based on this issue, the game is viewed in a third-person angle with a dynamic camera that changes depending on what the player is doing.

When the player is not engaged in combat, the camera should be close behind the Cindaku like in camera view 1 or 2 (Figure 17), this can make the player feel a sense of intimacy with the character and relate to it more. On the other hand, when the player is engaged in combat, the camera should be made wider like in camera view 3 or 4 (Figure 17) so the player has an easier time tracking where the enemies are. (Brown, 2019).

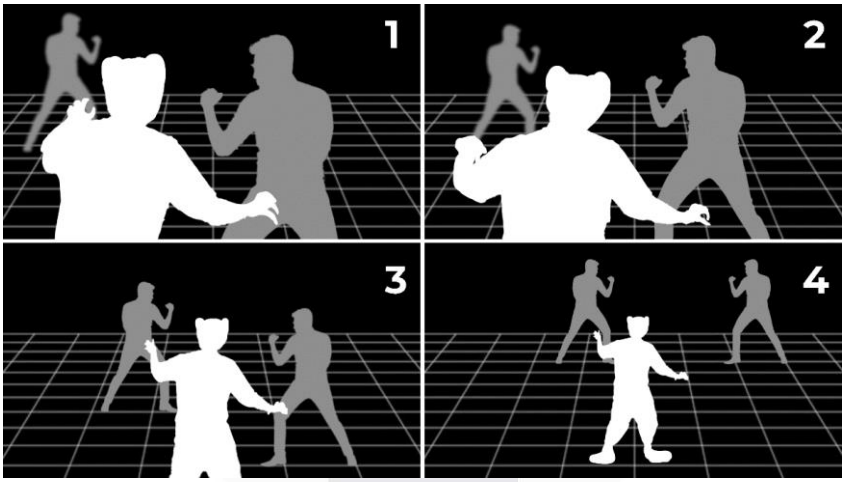

Figure 17 Alternative views of the in-game camera.
Source: Personal Documentation (2024).

UI

Since smartphones are the devices that most of this project's target audience own (IDN Research Institute, 2022), the placement of the UI elements like buttons needs to be kept in mind. They need to be placed in a way that does not cover up the action and guides the players' eyes properly. The size of the buttons can help the players recognize which button is more important or which button is used more often

(Masahiro, 2023). This is why the joystick and attack button (Figure 18) for the game are the biggest buttons as they are the buttons the player will press the most.

Figure 18 The placement of UI elements in the game.
Source: Personal Documentation (2024).

Unity Programming

The finished game prototype required several assets from the Unity Asset Store. Some of the assets used were a Character Movement Controller, a Camera Controller, Functional UI Buttons, and Terrain. Some programming was done for all the assets to work together properly with the animations.

Gameplay

The gameplay for the prototype consists of the player being able to walk around the level and being able to do two basic actions which is to attack and roar. To properly show Cindaku's role as a protector, a quest system was programmed in. The quest shows whenever there is any trouble in the forest, and the player can step in to resolve the problem. The quests can vary from stopping illegal loggers from cutting down trees to stopping hunters from hunting endangered animals.

Exporting/Building from Unity to Android

After the game prototype is complete, the user can export, also commonly referred to as build, the game into different platforms such as Windows, WebGL, iOS, and most importantly Android, which is what this project uses. There are several settings to be adjusted shown when building to Android, but the default settings can

be used just fine. Once finished building, an .apk file will be saved onto the user's PC. This .apk file can be moved to an Android device, the device can then install the game by opening the .apk file.

CONCLUSION

This research resulted in the 3D character animations of the Sumatran Weretiger, Cindaku, which were then implemented into a game prototype. The animations were created as an interactive educational material to explore the mythology of Cindaku and its values. The mythology of Cindaku contained values such as preserving the environment and protecting the balance of nature, for example the harmony between tigers and humans in a shared region.

The implementation of 3D animations specific for games required some considerations and care to make sure the intended animations work properly in-game. It is also important to note that when adapting traditional mythology into animation, certain nuances and values should be implemented with care.

SUGGESTION

Based on this research, below are some suggestions for future researchers:

1. Create animations based on other Sumatran mythology which encompasses the 12 principles of animation properly.
2. Develop a game based on Sumatran mythology using different programs.
3. Develop a game based on Sumatran mythology for a gaming console.

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